

XV.—On the Fructification of Lycoperdon, Phallus, and their allied Genera.—By the Rev. M. J. BERKELEY, M.A., F.L.S.

[With a Plate.]

A GREAT step has been taken towards a more satisfactory arrangement of Fungi by the discovery of the real structure of the fruit-bearing organs in *Hymenomycetes*. The species of the group *Tremellini* have not yet been sufficiently studied, and it is possible that fresh light may be thrown upon the *Sclerotiacei*, but, since the separation of *Discomycetes*, the other Fungi of the class agree admirably in structure. It is probable however that two groups of considerable importance, though not abounding in species, are still to be added to *Hymenomycetes*. The structure of *Trichogastres* and *Phalloidei* is confessedly very imperfectly understood. This has arisen partly from the extreme difficulty of ascertaining it with the older microscopes, but more especially from the plants having been seldom examined in a sufficiently early stage of growth. Till Klotzsch\* gave under the name of *Hymenangium* an analysis of *Rhizopogon virens*, which indeed is not arranged by Fries amongst the *Trichogastres*, nothing at all was known of the manner in which the reproductive organs are developed. The learned mycologist does not seem to have suspected its relation to the *Trichogastres*. He informs us that Dr. Walroth has found in Grunewald a genus allied to it, and that *Gautiera* of Vittadini belongs also to *Hymenomycetes*. Both are probably subterraneous Lycoperdons.

If a young plant of *Lycoperdon caelatum* or *L. gemmatum* be cut through and examined with a common pocket lens it will be found to consist of a fleshy mass perforated in every direction with minute elongated reticulato-anastomosing labyrinthiform cavities. The resemblance of these to the tubes of certain *Boleti* in an early stage of growth first led me to suspect that there must be some very close connexion between them. If a very thin slice now be taken, while the mass is yet firm, and before there is the slightest indication of a change of colour, the outer stratum of the walls of these cavities is found

\* Dietrich's Flora Regni Borussici, vol. vi. t. 382. Berlin, 1838.

XV.—On the Fructification of Lycoperdon, Phallus, and their allied Genera.—By the Rev. M. J. BERKELEY, M.A., F.L.S.

[With a Plate.]

A GREAT step has been taken towards a more satisfactory arrangement of Fungi by the discovery of the real structure of the fruit-bearing organs in *Hymenomycetes*. The species of the group *Tremellini* have not yet been sufficiently studied, and it is possible that fresh light may be thrown upon the *Sclerotiacei*, but, since the separation of *Discomycetes*, the other Fungi of the class agree admirably in structure. It is probable however that two groups of considerable importance, though not abounding in species, are still to be added to *Hymenomycetes*. The structure of *Trichogastres* and *Phalloidei* is confessedly very imperfectly understood. This has arisen partly from the extreme difficulty of ascertaining it with the older microscopes, but more especially from the plants having been seldom examined in a sufficiently early stage of growth. Till Klotzsch\* gave under the name of *Hymenangium* an analysis of *Rhizopogon virens*, which indeed is not arranged by Fries amongst the *Trichogastres*, nothing at all was known of the manner in which the reproductive organs are developed. The learned mycologist does not seem to have suspected its relation to the *Trichogastres*. He informs us that Dr. Walroth has found in Grunewald a genus allied to it, and that *Gautiera* of Vittadini belongs also to *Hymenomycetes*. Both are probably subterraneous Lycoperdons.

If a young plant of *Lycoperdon cælatum* or *L. gemmatum* be cut through and examined with a common pocket lens it will be found to consist of a fleshy mass perforated in every direction with minute elongated reticulato-anastomosing labyrinthiform cavities. The resemblance of these to the tubes of certain *Boleti* in an early stage of growth first led me to suspect that there must be some very close connexion between them. If a very thin slice now be taken, while the mass is yet firm, and before there is the slightest indication of a change of colour, the outer stratum of the walls of these cavities is found

\* Dietrich's Flora Regni Borussici, vol. vi. t. 382. Berlin, 1838.

XV.—*On the Fructification of Lycoperdon, Phallus, and their allied Genera.*—By the Rev. M. J. BERKELEY, M.A., F.L.S.

[With a Plate.]

A GREAT step has been taken towards a more satisfactory arrangement of Fungi by the discovery of the real structure of the fruit-bearing organs in *Hymenomycetes*. The species of the group *Tremellini* have not yet been sufficiently studied, and it is possible that fresh light may be thrown upon the *Sclerotiacei*, but, since the separation of *Discomycetes*, the other Fungi of the class agree admirably in structure. It is probable however that two groups of considerable importance, though not abounding in species, are still to be added to *Hymenomycetes*. The structure of *Trichogastres* and *Phalloidei* is confessedly very imperfectly understood. This has arisen partly from the extreme difficulty of ascertaining it with the older microscopes, but more especially from the plants having been seldom examined in a sufficiently early stage of growth. Till Klotzsch\* gave under the name of *Hymenangium* an analysis of *Rhizopogon virens*, which indeed is not arranged by Fries amongst the *Trichogastres*, nothing at all was known of the manner in which the reproductive organs are developed. The learned mycologist does not seem to have suspected its relation to the *Trichogastres*. He informs us that Dr. Walroth has found in Grunewald a genus allied to it, and that *Gautiera* of Vittadini belongs also to *Hymenomycetes*. Both are probably subterraneous Lycoperdons.

If a young plant of *Lycoperdon cælatum* or *L. gemmatum* be cut through and examined with a common pocket lens it will be found to consist of a fleshy mass perforated in every direction with minute elongated reticulato-anastomosing labyrinthiform cavities. The resemblance of these to the tubes of certain *Boleti* in an early stage of growth first led me to suspect that there must be some very close connexion between them. If a very thin slice now be taken, while the mass is yet firm, and before there is the slightest indication of a change of colour, the outer stratum of the walls of these cavities is found

\* Dietrich's Flora Regni Borussici, vol. vi. t. 382. Berlin, 1838.

XV.—*On the Fructification of Lycoperdon, Phallus, and their allied Genera.*—By the Rev. M. J. BERKELEY, M.A., F.L.S.

[With a Plate.]

A GREAT step has been taken towards a more satisfactory arrangement of Fungi by the discovery of the real structure of the fruit-bearing organs in *Hymenomycetes*. The species of the group *Tremellini* have not yet been sufficiently studied, and it is possible that fresh light may be thrown upon the *Sclerotiacei*, but, since the separation of *Discomycetes*, the other Fungi of the class agree admirably in structure. It is probable however that two groups of considerable importance, though not abounding in species, are still to be added to *Hymenomycetes*. The structure of *Trichogastres* and *Phalloidei* is confessedly very imperfectly understood. This has arisen partly from the extreme difficulty of ascertaining it with the older microscopes, but more especially from the plants having been seldom examined in a sufficiently early stage of growth. Till Klotzsch\* gave under the name of *Hymenangium* an analysis of *Rhizopogon virens*, which indeed is not arranged by Fries amongst the *Trichogastres*, nothing at all was known of the manner in which the reproductive organs are developed. The learned mycologist does not seem to have suspected its relation to the *Trichogastres*. He informs us that Dr. Walroth has found in Grunewald a genus allied to it, and that *Gautiera* of Vittadini belongs also to *Hymenomycetes*. Both are probably subterraneous Lycoperdons.

If a young plant of *Lycoperdon cælatum* or *L. gemmatum* be cut through and examined with a common pocket lens it will be found to consist of a fleshy mass perforated in every direction with minute elongated reticulato-anastomosing labyrinthiform cavities. The resemblance of these to the tubes of certain *Boleti* in an early stage of growth first led me to suspect that there must be some very close connexion between them. If a very thin slice now be taken, while the mass is yet firm, and before there is the slightest indication of a change of colour, the outer stratum of the walls of these cavities is found

\* Dietrich's Flora Regni Borussici, vol. vi. t. 382. Berlin, 1838.



to consist of pellucid obtuse cells placed parallel to each other like the pile of velvet, exactly as in the young hymenium of an Agaric or *Boletus*, but without any trace of those processes which have been considered by some authors as male organs, Occasionally one or two filaments cross from one wall to the other, and once I have seen these anastomose. At a more advanced stage of growth four little spicules are developed at the tips of the sporophores, all of which, as far as I have been able to observe, are fertile and of equal height\*, and on each of these spicules a globose spore is seated. It is clear that we have here a structure identical with that of true *Hymenomyces*, a circumstance which accords well with the fleshy habit and mode of growth.

There is some difficulty in ascertaining the exact structure of the species just noticed, as the fruit-bearing cells or sporophores are very small, and when the spicules are developed the substance becomes so flaccid that it is difficult to cut a proper slice even with the sharpest lancet. I have however satisfied myself as to the true structure by repeated observations. But should any difficulty arise in verifying it in the species in question, there will be none in doing so in *Lycoperdon giganteum*, Batsch, which more properly belongs to the genus *Bovista*.

In this species the fructifying mass consists of the same sinuous cavities, which are however smaller, so that the substance is more compact, and I have not seen them traversed by any filaments. In an early stage of growth, the surface of the hymenium, that is of the walls of the cavities, consists of short threads composed of two or three articulations which are slightly constricted at the joints, from which, especially from the last, spring short branchlets often consisting of a single cell. Sometimes two or more branchlets spring from the same point. Occasionally the threads are constricted without any dissepiments. The terminal articulations are obtuse and soon swell very much, so as greatly to exceed in dia-

\* M. Klotzsch figures however in his *Hymenangium virens* the sporophores as scattered and projecting beyond the surface of the hymenium, and he represents also what he calls anthers. This latter circumstance is confirmed by Corda in the Allgemeine Botan. Zeitung, though he differs from M. Klotzsch as to their form.

to consist of pellucid obtuse cells placed parallel to each other like the pile of velvet, exactly as in the young hymenium of an Agaric or *Boletus*, but without any trace of those processes which have been considered by some authors as male organs, Occasionally one or two filaments cross from one wall to the other, and once I have seen these anastomose. At a more advanced stage of growth four little spicules are developed at the tips of the sporophores, all of which, as far as I have been able to observe, are fertile and of equal height\*, and on each of these spicules a globose spore is seated. It is clear that we have here a structure identical with that of true *Hymenomyces*, a circumstance which accords well with the fleshy habit and mode of growth.

There is some difficulty in ascertaining the exact structure of the species just noticed, as the fruit-bearing cells or sporophores are very small, and when the spicules are developed the substance becomes so flaccid that it is difficult to cut a proper slice even with the sharpest lancet. I have however satisfied myself as to the true structure by repeated observations. But should any difficulty arise in verifying it in the species in question, there will be none in doing so in *Lycoperdon giganteum*, Batsch, which more properly belongs to the genus *Bovista*.

In this species the fructifying mass consists of the same sinuous cavities, which are however smaller, so that the substance is more compact, and I have not seen them traversed by any filaments. In an early stage of growth, the surface of the hymenium, that is of the walls of the cavities, consists of short threads composed of two or three articulations which are slightly constricted at the joints, from which, especially from the last, spring short branchlets often consisting of a single cell. Sometimes two or more branchlets spring from the same point. Occasionally the threads are constricted without any dissepiments. The terminal articulations are obtuse and soon swell very much, so as greatly to exceed in dia-

\* M. Klotzsch figures however in his *Hymenangium virens* the sporophores as scattered and projecting beyond the surface of the hymenium, and he represents also what he calls anthers. This latter circumstance is confirmed by Corda in the Allgemeine Botan. Zeitung, though he differs from M. Klotzsch as to their form.

to consist of pellucid obtuse cells placed parallel to each other like the pile of velvet, exactly as in the young hymenium of an Agaric or *Boletus*, but without any trace of those processes which have been considered by some authors as male organs, Occasionally one or two filaments cross from one wall to the other, and once I have seen these anastomose. At a more advanced stage of growth four little spicules are developed at the tips of the sporophores, all of which, as far as I have been able to observe, are fertile and of equal height\*, and on each of these spicules a globose spore is seated. It is clear that we have here a structure identical with that of true *Hymenomyces*, a circumstance which accords well with the fleshy habit and mode of growth.

There is some difficulty in ascertaining the exact structure of the species just noticed, as the fruit-bearing cells or sporophores are very small, and when the spicules are developed the substance becomes so flaccid that it is difficult to cut a proper slice even with the sharpest lancet. I have however satisfied myself as to the true structure by repeated observations. But should any difficulty arise in verifying it in the species in question, there will be none in doing so in *Lycoperdon giganteum*, Batsch, which more properly belongs to the genus *Bovista*.

In this species the fructifying mass consists of the same sinuous cavities, which are however smaller, so that the substance is more compact, and I have not seen them traversed by any filaments. In an early stage of growth, the surface of the hymenium, that is of the walls of the cavities, consists of short threads composed of two or three articulations which are slightly constricted at the joints, from which, especially from the last, spring short branchlets often consisting of a single cell. Sometimes two or more branchlets spring from the same point. Occasionally the threads are constricted without any dissepiments. The terminal articulations are obtuse and soon swell very much, so as greatly to exceed in dia-

\* M. Klotzsch figures however in his *Hymenangium virens* the sporophores as scattered and projecting beyond the surface of the hymenium, and he represents also what he calls anthers. This latter circumstance is confirmed by Corda in the Allgemeine Botan. Zeitung, though he differs from M. Klotzsch as to their form.

to consist of pellucid obtuse cells placed parallel to each other like the pile of velvet, exactly as in the young hymenium of an Agaric or *Boletus*, but without any trace of those processes which have been considered by some authors as male organs, Occasionally one or two filaments cross from one wall to the other, and once I have seen these anastomose. At a more advanced stage of growth four little spicules are developed at the tips of the sporophores, all of which, as far as I have been able to observe, are fertile and of equal height\*, and on each of these spicules a globose spore is seated. It is clear that we have here a structure identical with that of true *Hymenomyces*, a circumstance which accords well with the fleshy habit and mode of growth.

There is some difficulty in ascertaining the exact structure of the species just noticed, as the fruit-bearing cells or sporophores are very small, and when the spicules are developed the substance becomes so flaccid that it is difficult to cut a proper slice even with the sharpest lancet. I have however satisfied myself as to the true structure by repeated observations. But should any difficulty arise in verifying it in the species in question, there will be none in doing so in *Lycoperdon giganteum*, Batsch, which more properly belongs to the genus *Bovista*.

In this species the fructifying mass consists of the same sinuous cavities, which are however smaller, so that the substance is more compact, and I have not seen them traversed by any filaments. In an early stage of growth, the surface of the hymenium, that is of the walls of the cavities, consists of short threads composed of two or three articulations which are slightly constricted at the joints, from which, especially from the last, spring short branchlets often consisting of a single cell. Sometimes two or more branchlets spring from the same point. Occasionally the threads are constricted without any dissepiments. The terminal articulations are obtuse and soon swell very much, so as greatly to exceed in dia-

\* M. Klotzsch figures however in his *Hymenangium virens* the sporophores as scattered and projecting beyond the surface of the hymenium, and he represents also what he calls anthers. This latter circumstance is confirmed by Corda in the Allgemeine Botan. Zeitung, though he differs from M. Klotzsch as to their form.



meter those on which they are seated. When arrived at their full growth they are somewhat obovate and produce four spicules which at length are surmounted each with a globose spore. When the spores are fully developed the sporophores wither, and if a solution of iodine be applied, which changes the spores to a rich brown, they will be seen still adhering by their spicules to the faded sporophores. The spores soon become free, but the spicule often still adheres to them as figured by Dr. Greville, 'Sc. Crypt. Fl.' t. 336, but they are not attached to the intermingled filaments. In *Bovista plumbea* the spores have very long peduncles. I regret that I have not been able to meet with a specimen in a fit stage of growth to show them adhering to their sporophores. Up to the time when the sporophores have nearly arrived at their full growth, the structure is essentially the same as in *Lyc. giganteum*, as will be seen from the subjoined figures.

Young specimens of *Geastrum* show the same anastomosing cavities as *Lycoperdon* and *Bovista*; I have not however at present been able to meet with a specimen sufficiently young to show the development of the spores. The only species which occurs abundantly in this neighbourhood is *G. Bryantii*, and in this species the fruit-bearing cells are already withered in extremely small specimens long before the volva is ruptured.

I regret not to have had an opportunity of examining *Scleroderma* and *Elaphomyces* in a sufficiently early stage of growth, but as M. Klotzsch has demonstrated the existence of true subterranean *Hymenomyces* it is probable that they will be found to agree in structure. With respect to *Batarrea Tulostoma*, *Cauloglossum* and *Podaxon*, they are so evidently allied to *Lycoperdon* that there can be no doubt that they also are *Hymenomyces*. *Polysaccum* according to Corda has spores furnished with an hilum, and seated upon short distinct cells springing from the flocci. It is probably therefore an ally of *Lycoperdon*. This however, and the genera not named above, referred to *Trichogastres*, require due examination.

I now come to the consideration of the genus *Phallus*, and I have here to regret that my observations are confined to *Phallus caninus*, but as far as that goes the proof is satisfac-

meter those on which they are seated. When arrived at their full growth they are somewhat obovate and produce four spicules which at length are surmounted each with a globose spore. When the spores are fully developed the sporophores wither, and if a solution of iodine be applied, which changes the spores to a rich brown, they will be seen still adhering by their spicules to the faded sporophores. The spores soon become free, but the spicule often still adheres to them as figured by Dr. Greville, 'Sc. Crypt. Fl.' t. 336, but they are not attached to the intermingled filaments. In *Bovista plumbea* the spores have very long peduncles. I regret that I have not been able to meet with a specimen in a fit stage of growth to show them adhering to their sporophores. Up to the time when the sporophores have nearly arrived at their full growth, the structure is essentially the same as in *Lyc. giganteum*, as will be seen from the subjoined figures.

Young specimens of *Geastrum* show the same anastomosing cavities as *Lycoperdon* and *Bovista*; I have not however at present been able to meet with a specimen sufficiently young to show the development of the spores. The only species which occurs abundantly in this neighbourhood is *G. Bryantii*, and in this species the fruit-bearing cells are already withered in extremely small specimens long before the volva is ruptured.

I regret not to have had an opportunity of examining *Scleroderma* and *Elaphomyces* in a sufficiently early stage of growth, but as M. Klotzsch has demonstrated the existence of true subterranean *Hymenomycetes* it is probable that they will be found to agree in structure. With respect to *Batarrea Tulostoma*, *Cauloglossum* and *Podaxon*, they are so evidently allied to *Lycoperdon* that there can be no doubt that they also are *Hymenomycetes*. *Polysaccum* according to Corda has spores furnished with an hilum, and seated upon short distinct cells springing from the flocci. It is probably therefore an ally of *Lycoperdon*. This however, and the genera not named above, referred to *Trichogastres*, require due examination.

I now come to the consideration of the genus *Phallus*, and I have here to regret that my observations are confined to *Phallus caninus*, but as far as that goes the proof is satisfac-

meter those on which they are seated. When arrived at their full growth they are somewhat obovate and produce four spicules which at length are surmounted each with a globose spore. When the spores are fully developed the sporophores wither, and if a solution of iodine be applied, which changes the spores to a rich brown, they will be seen still adhering by their spicules to the faded sporophores. The spores soon become free, but the spicule often still adheres to them as figured by Dr. Greville, 'Sc. Crypt. Fl.' t. 336, but they are not attached to the intermingled filaments. In *Bovista plumbea* the spores have very long peduncles. I regret that I have not been able to meet with a specimen in a fit stage of growth to show them adhering to their sporophores. Up to the time when the sporophores have nearly arrived at their full growth, the structure is essentially the same as in *Lyc. giganteum*, as will be seen from the subjoined figures.

Young specimens of *Geastrum* show the same anastomosing cavities as *Lycoperdon* and *Bovista*; I have not however at present been able to meet with a specimen sufficiently young to show the development of the spores. The only species which occurs abundantly in this neighbourhood is *G. Bryantii*, and in this species the fruit-bearing cells are already withered in extremely small specimens long before the volva is ruptured.

I regret not to have had an opportunity of examining *Scleroderma* and *Elaphomyces* in a sufficiently early stage of growth, but as M. Klotzsch has demonstrated the existence of true subterranean *Hymenomyces* it is probable that they will be found to agree in structure. With respect to *Batarrea Tulostoma*, *Cauloglossum* and *Podaxon*, they are so evidently allied to *Lycoperdon* that there can be no doubt that they also are *Hymenomyces*. *Polysaccum* according to Corda has spores furnished with an hilum, and seated upon short distinct cells springing from the flocci. It is probably therefore an ally of *Lycoperdon*. This however, and the genera not named above, referred to *Trichogastres*, require due examination.

I now come to the consideration of the genus *Phallus*, and I have here to regret that my observations are confined to *Phallus caninus*, but as far as that goes the proof is satisfac-

meter those on which they are seated. When arrived at their full growth they are somewhat obovate and produce four spicules which at length are surmounted each with a globose spore. When the spores are fully developed the sporophores wither, and if a solution of iodine be applied, which changes the spores to a rich brown, they will be seen still adhering by their spicules to the faded sporophores. The spores soon become free, but the spicule often still adheres to them as figured by Dr. Greville, 'Sc. Crypt. Fl.' t. 336, but they are not attached to the intermingled filaments. In *Bovista plumbea* the spores have very long peduncles. I regret that I have not been able to meet with a specimen in a fit stage of growth to show them adhering to their sporophores. Up to the time when the sporophores have nearly arrived at their full growth, the structure is essentially the same as in *Lyc. giganteum*, as will be seen from the subjoined figures.

Young specimens of *Geastrum* show the same anastomosing cavities as *Lycoperdon* and *Bovista*; I have not however at present been able to meet with a specimen sufficiently young to show the development of the spores. The only species which occurs abundantly in this neighbourhood is *G. Bryantii*, and in this species the fruit-bearing cells are already withered in extremely small specimens long before the volva is ruptured.

I regret not to have had an opportunity of examining *Scleroderma* and *Elaphomyces* in a sufficiently early stage of growth, but as M. Klotzsch has demonstrated the existence of true subterranean *Hymenomycetes* it is probable that they will be found to agree in structure. With respect to *Batarrea Tulostoma*, *Cauloglossum* and *Podaxon*, they are so evidently allied to *Lycoperdon* that there can be no doubt that they also are *Hymenomycetes*. *Polysaccum* according to Corda has spores furnished with an hilum, and seated upon short distinct cells springing from the flocci. It is probably therefore an ally of *Lycoperdon*. This however, and the genera not named above, referred to *Trichogastres*, require due examination.

I now come to the consideration of the genus *Phallus*, and I have here to regret that my observations are confined to *Phallus caninus*, but as far as that goes the proof is satisfac-



tory that it belongs to the class *Hymenomyces*. The difficulty of examination is here again considerable and the structure can be ascertained in young individuals only, in which the stem is confined to the pileus, and the fructifying mass still spread over its apex. I shall here quote a passage from Brongniart's 'Essai d'une classification naturelle des Champignons,' p. 24, who it is to be observed places the Clathroidées amongst his "champignons proprement dits." Speaking of the fructifying mass he says, "Cette couche est formée de cellules membraneuses très minces, aux parois desquelles les sporules paraissent fixées. Mais comment ces sporules sont elles enveloppées? Sont elles nues et libres dans ces cellules, ou sont-ce des sporidies ou même des thèques fixées à leurs parois? C'est ce que nous ignorons." This I believe is the sum of our knowledge on the subject up to the present time. I have not at least met with anything additional, but there are several German journals to which I have not access.

As in *Lycoperdon*, the fructifying mass consists of a highly sinuated hymenium. The walls are composed of elongated somewhat spatulate cells surmounted with from four to six spicules, each of which bears an oblong spore. The sporophores here again appear to be all fertile and of nearly the same height, but I cannot speak so positively on this point from the extreme difficulty of cutting a clean slice from a mass which at all times is very flaccid. It will be observed that when the number exceeds four the additional spicule is seated between two, which form one side of a square ( $\cdot \overset{\cdot}{\cdot} \overset{\cdot}{\cdot}$ ) and that if a sixth is present it is placed opposite to the fifth ( $\cdot \overset{\cdot}{\cdot} \overset{\cdot}{\cdot}$ ).

Here again then we have an Hymenomycetous fungus, and there can be no doubt that the same structure will be found in all the *Phalloidei*. Nor is there any reason why they should not follow directly after the *Trichogastres* through *Batarrea*, the only difference being that the filaments which form the trama, that is the substance between the two surfaces of the hymenium, in the one case become rigid, in the other deliquescent. We have already seen that the sporophores in *L. giganteum* become flaccid and collapse, and it is probably in consequence of this that the mass becomes pulpy, a circumstance noticed by Fries as analogous to the deliquescence in

tory that it belongs to the class *Hymenomyces*. The difficulty of examination is here again considerable and the structure can be ascertained in young individuals only, in which the stem is confined to the pileus, and the fructifying mass still spread over its apex. I shall here quote a passage from Brongniart's 'Essai d'une classification naturelle des Champignons,' p. 24, who it is to be observed places the Clathroidées amongst his "champignons proprement dits." Speaking of the fructifying mass he says, "Cette couche est formée de cellules membraneuses très minces, aux parois desquelles les sporules paraissent fixées. Mais comment ces sporules sont elles enveloppées? Sont elles nues et libres dans ces cellules, ou sont-ce des sporidies ou même des thèques fixées à leurs parois? C'est ce que nous ignorons." This I believe is the sum of our knowledge on the subject up to the present time. I have not at least met with anything additional, but there are several German journals to which I have not access.

As in *Lycoperdon*, the fructifying mass consists of a highly sinuated hymenium. The walls are composed of elongated somewhat spatulate cells surmounted with from four to six spicules, each of which bears an oblong spore. The sporophores here again appear to be all fertile and of nearly the same height, but I cannot speak so positively on this point from the extreme difficulty of cutting a clean slice from a mass which at all times is very flaccid. It will be observed that when the number exceeds four the additional spicule is seated between two, which form one side of a square ( $\cdot \cdot \cdot \cdot$ ) and that if a sixth is present it is placed opposite to the fifth ( $\cdot \cdot \cdot \cdot \cdot \cdot$ ).

Here again then we have an Hymenomycetous fungus, and there can be no doubt that the same structure will be found in all the *Phalloidei*. Nor is there any reason why they should not follow directly after the *Trichogastres* through *Batarrea*, the only difference being that the filaments which form the trama, that is the substance between the two surfaces of the hymenium, in the one case become rigid, in the other deliquescent. We have already seen that the sporophores in *L. giganteum* become flaccid and collapse, and it is probably in consequence of this that the mass becomes pulpy, a circumstance noticed by Fries as analogous to the deliquescence in

tory that it belongs to the class *Hymenomyces*. The difficulty of examination is here again considerable and the structure can be ascertained in young individuals only, in which the stem is confined to the pileus, and the fructifying mass still spread over its apex. I shall here quote a passage from Brongniart's 'Essai d'une classification naturelle des Champignons,' p. 24, who it is to be observed places the Clathroidées amongst his "champignons proprement dits." Speaking of the fructifying mass he says, "Cette couche est formée de cellules membraneuses très minces, aux parois desquelles les sporules paraissent fixées. Mais comment ces sporules sont elles enveloppées? Sont elles nues et libres dans ces cellules, ou sont-ce des sporidies ou même des thèques fixées à leurs parois? C'est ce que nous ignorons." This I believe is the sum of our knowledge on the subject up to the present time. I have not at least met with anything additional, but there are several German journals to which I have not access.

As in *Lycoperdon*, the fructifying mass consists of a highly sinuated hymenium. The walls are composed of elongated somewhat spatulate cells surmounted with from four to six spicules, each of which bears an oblong spore. The sporophores here again appear to be all fertile and of nearly the same height, but I cannot speak so positively on this point from the extreme difficulty of cutting a clean slice from a mass which at all times is very flaccid. It will be observed that when the number exceeds four the additional spicule is seated between two, which form one side of a square ( $\cdot \overset{\cdot}{\cdot} \overset{\cdot}{\cdot}$ ) and that if a sixth is present it is placed opposite to the fifth ( $\cdot \overset{\cdot}{\cdot} \overset{\cdot}{\cdot}$ ).

Here again then we have an Hymenomycetous fungus, and there can be no doubt that the same structure will be found in all the *Phalloidei*. Nor is there any reason why they should not follow directly after the *Trichogastres* through *Batarrea*, the only difference being that the filaments which form the trama, that is the substance between the two surfaces of the hymenium, in the one case become rigid, in the other deliquescent. We have already seen that the sporophores in *L. giganteum* become flaccid and collapse, and it is probably in consequence of this that the mass becomes pulpy, a circumstance noticed by Fries as analogous to the deliquescence in



tory that it belongs to the class *Hymenomyces*. The difficulty of examination is here again considerable and the structure can be ascertained in young individuals only, in which the stem is confined to the pileus, and the fructifying mass still spread over its apex. I shall here quote a passage from Brongniart's 'Essai d'une classification naturelle des Champignons,' p. 24, who it is to be observed places the Clathroidées amongst his "champignons proprement dits." Speaking of the fructifying mass he says, "Cette couche est formée de cellules membraneuses très minces, aux parois desquelles les sporules paraissent fixées. Mais comment ces sporules sont elles enveloppées? Sont elles nues et libres dans ces cellules, ou sont-ce des sporidies ou même des thèques fixées à leurs parois? C'est ce que nous ignorons." This I believe is the sum of our knowledge on the subject up to the present time. I have not at least met with anything additional, but there are several German journals to which I have not access.

As in *Lycoperdon*, the fructifying mass consists of a highly sinuated hymenium. The walls are composed of elongated somewhat spatulate cells surmounted with from four to six spicules, each of which bears an oblong spore. The sporophores here again appear to be all fertile and of nearly the same height, but I cannot speak so positively on this point from the extreme difficulty of cutting a clean slice from a mass which at all times is very flaccid. It will be observed that when the number exceeds four the additional spicule is seated between two, which form one side of a square ( $\cdot \overset{\cdot}{\cdot} \overset{\cdot}{\cdot}$ ) and that if a sixth is present it is placed opposite to the fifth ( $\cdot \overset{\cdot}{\cdot} \overset{\cdot}{\cdot}$ ).

Here again then we have an Hymenomycetous fungus, and there can be no doubt that the same structure will be found in all the *Phalloidei*. Nor is there any reason why they should not follow directly after the *Trichogastres* through *Batarrea*, the only difference being that the filaments which form the trama, that is the substance between the two surfaces of the hymenium, in the one case become rigid, in the other deliquescent. We have already seen that the sporophores in *L. giganteum* become flaccid and collapse, and it is probably in consequence of this that the mass becomes pulpy, a circumstance noticed by Fries as analogous to the deliquescence in









